Intelligent storage networking for IBM System Storage IT simplification and business continuity solutions

Cisco MDS 9509 for IBM System Storage

The Cisco MDS 9509 for IBM System Storage offers 1, 2, 4, 8 and 10 Gbps link speeds with up to 336 Fibre Channel ports in a 14U enclosure

Highlights

- ***Provides Fibre Channel throughput of up to 8 gigabits per second (Gbps) per port and up to 64 Gbps with each PortChannel Inter-Switch Link connection***
- ***Offers scalability from 12 to 336 1, 2, 4 and 8 Gbps Fibre Channel ports***
- ***Offers 10-Gbps ISL ports for inter-data center links over metro optical networks***
- ***Offers Gigabit Ethernet IP (GbE) ports for iSCSI or FCIP connectivity over global networks***
- ***High-availability design with support for non-disruptive firmware upgrades***
- ***Includes Virtual SAN (VSAN) capability for SAN consolidation into virtual SAN islands on a single physical fabric***
- ***Enterprise, SAN Extension over IP, Mainframe and Storage Services Enabler and Fabric Manager Server packages provide added function and value***

High performance and manageability for SANs

The **Cisco MDS 9509 for IBM®** System Storage™ provides 1, 2, 4, 8 and 10 Gbps Fibre Channel switch connectivity and intelligent network services to help improve the security, performance and manageability required to consolidate geographically dispersed storage devices into a large enterprise SAN.

Improved internal bandwidth for higher scalability

The Cisco MDS 9509 for IBM System Storage utilizes two **Supervisor-2 modules** to support high availability and performance. The Supervisor-2 Module combines an intelligent control module and a high-performance cross-bar switch fabric in a single unit. It uses Fabric Shortest Path First (FSPF) multipath routing, which supports load balancing across a maximum of 16 equal-cost paths that dynamically reroute traffic if a switch fails.

Each Supervisor-2 Module provides the necessary crossbar bandwidth to deliver full system performance in the Cisco MDS 9509 director with up to seven Fibre Channel switching modules. Loss or removal of a single crossbar module has no impact on system performance.

Connectivity, compatibility and traffic management

The Cisco MDS 9509 for IBM System Storage requires a minimum of one switching module and allows a maximum of seven. These modules are available in configurations of 4 Gbps (12, 24 and 48-port) and 8 Gbps (24 and 48-port), enabling the Cisco MDS 9509 to support 12 to 336 Fibre Channel ports per chassis. Optionally, a 4-port 10 Gbps Fibre Channel module is available for high-performance Inter-Switch Link (ISL) connections over metro optical networks.

Switching modules are hot-swappable with small form-factor pluggable (SFP) optic transceivers and LC interface support. The PortChannel capability enables users to aggregate up to 16 physical Inter-Switch Links into a single logical bundle, providing optimized bandwidth utilization across all links.

12-, 24- and 48-port 4 Gbps switching modules: Configuring the switch for the application environment

The **12-port 4 Gbps Fibre Channel Switching Module** delivers high performance for the most demanding storage networking applications. Autosensing 1, 2 and 4 Gbps ports deliver up to 96 Gbps of continuous aggregate bandwidth, which provides up to 8 Gbps throughput per port (full duplex). The 12-port switching module is well suited for attaching highest-performance 4 Gbps enabled servers and storage subsystems as well as to connect to other switches using 4 Gbps ISL connections.

The **24-port 4 Gbps Fibre Channel Switching Module** handles high-performance storage networking applications. Twenty-four autosensing 1, 2 and 4 Gbps ports deliver sustained bandwidth to meet the performance requirements of enterprise-class storage and servers. Port bandwidth reservation enables 1, 2 or 4 Gbps switching bandwidth to be dedicated to a port, including highest-performance ISL ports. The 24-port switching module is well suited for attaching high-performance servers and storage subsystems as well as to connect to other switches using ISL connections.

The **48-port 4 Gbps Fibre Channel Switching Module** offers an optimal balance of performance and port density. Forty-eight autosensing 1, 2 and 4 Gbps ports deliver sustained bandwidth to meet a wide range of performance requirements for a mixture of SMB and enterprise-class storage and servers. Port bandwidth reservation enables 1, 2 or 4 Gbps switching bandwidth to be flexibly dedicated to ports to meet a wide range of application requirements. This module provides a low-cost means of attaching lower-performance servers and storage subsystems to the high-performance crossbar switch fabric without requiring ISLs.

24-, 48- and 4/44-port 8 Gbps switching modules: Configuring the switch for fast link speeds

The **24-port 8 Gbps Fibre Channel Switching Module** provides uncompromising performance of up to 96 Gbps of continuous aggregate bandwidth, providing up to 16 Gbps throughput per port (full duplex). This module is best suited for connection to 4 and 8 Gbps high-performance storage devices and for ISL connectivity.

The **48-port 8 Gbps Fibre Channel Switching Module** delivers an ideal balance of performance and scalability. Its 48 autosensing 1, 2, 4 and 8 Gbps ports deliver up to 96 Gbps of full-duplex bandwidth to meet the performance demands of enterprise-class or highly virtualized servers. Through easy-to-use traffic engineering capabilities, the 48-port 8 Gbps Fibre Channel Switching Module offers the flexibility to provide predictable high-performance storage and inter-switch connectivity, fully utilizing the available bandwidth.

The **4/44-port 8 Gbps Host-Optimized Fibre Channel Switching Module** is optimized for host connectivity. The module enables storage network consolidation with high-density, cost-effective connectivity. Four 8-Gbps ports and 44 4-Gbps ports deliver 96 Gbps of full-duplex bandwidth, sufficient for the majority of today's standard servers.

4-port 10 Gbps switching module: Configuring the switch for metro business continuity

The **4-port 10 Gbps Fibre Channel Switching Module** is built to deliver high-bandwidth links for metro business continuity solutions. The module uses hot-swappable X2 form-factor pluggable, SC type transceivers. The module is well suited for ISL links between data centers across metro optical networks.

Port Bandwidth Reservation, available on all switching modules, enables switching bandwidth to be dedicated to specific ports. This unique feature of the Cisco MDS 9000 family enables great flexibility in bandwidth allocation to support a mix of applications within a single module, including high-performance ISLs. By combining various switching modules in a single modular chassis, it is possible to design storage networks optimized for cost and performance in a wide range of application environments. This application-oriented approach to port deployment can reduce the number of switches and ISLs required in a storage network, in many cases eliminating the need for core-edge network topologies.

A switch built for high availability

The Cisco MDS 9509 for IBM System Storage combines support for non-disruptive software upgrades, stateful process restart/failover and redundancy of active hardware components to support director-class availability. The Supervisor Module-2 has the ability to automatically restart failed processes and complete synchronization between the active and standby Supervisor Modules to help support stateful failover without disruption to traffic.

A switch for virtual servers and applications

Server virtualization means that a SAN must concurrently support thousands of diverse, tiered applications, each with unique performance requirements. These applications and the virtual machines (VMs) they run on are not bounded by physical servers and network ports. The Cisco MDS 9000 family provides deterministic hardware performance and a rich feature set that allows VMs to have the same SAN attributes as a physical server. On a per-VM basis, the MDS 9000 family NX-OS firmware offers Virtual SAN (VSAN) isolation, quality of service (QoS) policies, access control, performance monitoring, and data protection to enable scalability and mobility of VMs.

A switch for virtual SANs

Ideal for efficient, secure SAN consolidation, ANSI T11 compliant VSANs allow more efficient storage network utilization by creating hardware-based isolated environments within a single

physical SAN fabric or switch. Each VSAN can be zoned as a typical SAN, maintaining its own fabric services for added scalability and resilience. VSANs allow the cost of SAN infrastructure to be shared among more users, while ensuring absolute segregation of traffic and retaining independent control of configuration on a VSAN-by-VSAN basis. Through unique virtualization features, VSAN benefits can be extended to virtualized servers, providing the foundation for an end-to-end virtualized data center. VSANs also greatly reduce the probability that a misconfiguration or component failure in one FSAN will affect other VSANs. VSAN-based management access controls enhance security by simplifying partitioning of SAN management responsibilities between mainframe and open systems environments.

Each 8 Gbps switching module supports Inter-VSAN Routing (IVR) on every Fibre Channel port. IVR allows selective transfer of data traffic between specific initiators and targets of different VSANs while maintaining isolation of control traffic within each VSAN, thereby maintaining fabric stability and availability.

Simplified storage network management

The Cisco MDS 9509 provides three principal modes of management: the Cisco MDS 9000 family command-line interface (CLI), Cisco Fabric Manager and integration with third-party storage management tools. The Cisco MDS 9509 presents the user with a consistent, logical CLI. Adhering to the syntax of the widely known Cisco IOS CLI, the Cisco MDS 9000 for IBM System Storage family CLI has broad functionality.

Multiservice support and traffic-management features

IP and Multiservice 18/4 Module features offer Gigabit Ethernet ports for iSCSI or FCIP connectivity, software configurable on a port-by-port basis:

- *The* **IP Storage Service Module** *feature provides eight iSCSI ports.*
- *The* **Multiservice 18/4 Module** *offers four Gigabit Ethernet iSCSI ports and 18 4-Gbps Fibre Channel ports.*
- *The* **SAN Extension over IP Package** *for IP Services and Multiservice 18/4 Module features add FCIP support. SAN Extension over IP Package helps improve performance with FCIP Compression, Write Acceleration and Tape Acceleration and helps improve security with Inter-VSAN Routing for FCIP.*

Security for large enterprise SANs

Because storage networks require security, the Cisco MDS 9509 for IBM System Storage provides extensive security measures at possible points of attack to help prevent unauthorized access and snooping.

Additionally, data-plane traffic is secured through VSANs, which segregate traffic between multiple virtual fabrics within the single physical fabric infrastructure, and through hardware-enforced zoning, which further segregates traffic within each VSAN.

Advanced security and management

The **Enterprise Package** feature provides advanced security and management capabilities. The package helps

improve management with quality of service (QoS) and helps improve security with Inter-VSAN Routing for Fibre Channel, and enhanced network security capabilities including switch-switch and host authentication.

The **Fabric Manager Server Package** extends Cisco Fabric Manager by providing historical performance data collection, centralized management services and support for advanced application integration. The package provides Fibre Channel statistics monitoring, performance thresholds, reporting, graphing and performance database capabilities that can help simplify management of large-enterprise, metro and global SAN infrastructures.

The **Mainframe Package** feature enables mainframe storage network applications including FICON® protocol; FICON Control Unit Port (CUP); FICON and FCP intermixing; FICON Switch Cascading and Fabric Binding. This feature helps provide secure mainframe and open-system SAN infrastructure consolidation.

Storage network applications

The **Storage Services Module**, based on the 32-port 2-Gbps Switching Module, is a highly specialized feature that provides intelligent storage services in addition to 1 and 2 Gbps Fibre Channel switching. When combined with the **Storage Services Enabler Package**, the module enables independent software vendors (ISVs) to develop intelligent fabric applications. IBM support for these ISV applications is limited to IBM TotalStorage® Proven™ Solutions. For the most current IBM TotalStorage Proven application information, visit: **ibm.com**/systems/storage/solutions/proven/

Capabilities to help reduce TCO

VSAN capability enables more efficient SAN utilization by creating multiple isolated environments within a single SAN fabric. Each VSAN can be zoned as a typical SAN and maintains its own fabric services for added scalability and resilience. VSANs allow the cost of the SAN infrastructure to be shared among more users, as well as help provide segregation and security of traffic and retain independent control of configurations on a VSAN-by-VSAN basis.

The second-generation 4 Gbps Fibre Channel Modules, with 24 and 48 ports, compared to the prior generation 2 Gbps 16-port and 32-port features, offer up to 33 percent reduced power and cooling per port. The second-generation Multiservice 18/4 Module, with 22 ports, compared to the prior-generation feature with 16 ports, offers up to 27 percent reduced power and cooling per port.

Cisco MDS 9509 for IBM System Storage at a glance[1]

IBM product numbers	2054-E07—Cisco MDS 9509 for IBM System Storage includes dual Supervisor-2 cards, dual 3000W AC power supplies. All models include Cisco SAN-OS 3.2 firmware with Cisco Fabric Manager, VSAN and PortChannel capabilities. Features: 8-port IP Services Module SAN Extension over IP for 8-port IP Services Module Storage Services Module 4-port 10 Gbps Fibre Channel Switching Module (no optics) 12-port 4 Gbps Fibre Channel Switching Module (no optics) 24-port 4 Gbps Fibre Channel Switching Module (no optics) 24-port 8 Gbps Fibre Channel Switching Module (no optics) 48-port 4 Gbps Fibre Channel Switching Module (no optics) 48-port 8 Gbps Fibre Channel Switching Module (no optics) 4/44-port 8 Gbps Fibre Channel Switching Module (no optics) Multiservice 18/4 Module (includes two 4 Gbps shortwave SFPs) Fibre Channel 10 Gbps longwave X2 transceivers Tri-rate shortwave SFP transceivers (1 and 2 Gbps FC and Gigabit Ethernet) Fibre Channel 2 Gbps SFP transceivers Ethernet Copper GbE SFP Transceiver Fibre Channel 4 Gbps SFP transceivers, 4-pack Fibre Channel 8 Gbps SFP transceivers, single and 4-pack Flash Memory Card MDS 9500 Enterprise Package MDS 9500 Fabric Manager Server Package MDS 9500 Mainframe Package MDS 9500 Storage Services Enabler Package
Fibre optic cables	Multimode, 50u fibre optical cables with SC and/or LC connectors are available

Cisco MDS 9509 for IBM System Storage at a glance[1]

Base warranty	One year, 24x7, same day, on-site IBM warranty.
Supported systems[3]	IBM Power Systems™ servers, IBM System p® and selected IBM RS/6000® servers; IBM System x™ and selected IBM Netfinity® servers; other Intel® processor-based servers running the Linux®, Microsoft® Windows NT® or Microsoft Windows® 2000 operating systems; selected Sun™ and HP servers; IBM TotalStorage Enterprise Storage Server® (ESS); IBM System Storage DS8000™ Disk Systems; IBM System Storage DS6000™ Disk Systems; IBM System Storage DS4000™ Disk Systems; IBM TotalStorage 3590 and 3592 Tape Drives; IBM TotalStorage 3494 Virtual Tape Server; IBM TotalStorage 3532, 3583 and 3584 Tape Libraries; and other selected storage systems.
Physical characteristics	
Dimensions	62.3 cm H x 43.9 cm W x 46.8 cm D (24.5 in x 17.25 in x 18.4 in)
Rack height	14U
Depth including cable guide	55.0 cm (21.6 in)
Weight (fully configured chassis)	78 kg (170 lb)
Directors are rack-mountable in a standard 19-inch EIA rack, meeting Cisco requirements defined in the recommended installation procedures[2]. IBM TotalStorage SAN Cabinet Model C36 (2109-C36) meets these requirements.	
Operating environment	
Temperature	0° to 40° C (32° to 104° F)
Relative humidity	10% to 90%
Input	100 to 240 V AC
	50-60 Hz nominal
Output	1300 W at 110 to 120 V AC

For more information

Contact your IBM representative or IBM Business Partner, or visit:

ibm.com/systems/storage/san/ctype/

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[1] For complete and current Cisco specifications, please visit www.cisco.com/go/ibm/storage.

[2] Because this switch is designed with side-to-side airflow, Cisco recommends a minimum air space of 16 cm (6 in) between walls and the chassis air vents, and a minimum separation of 30 cm (12 in) between two chassis to prevent overheating.

[3] For the most current list of supported servers and storage, please visit **ibm.com**/systems/storage/san/ctype/.

IBM Systems and Technology Group
Route 100
Somers, New York 10589

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